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# Comparison of scar outcomes of alar base and columella using irradiated polyglactin 911: a single-blind study

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## Abstract

**Aim**: The formation of scars on the face after open septorhinoplasty (SRP) with alar base reduction may disturb the patient due to cosmetic concerns. This study aimed to compare scar outcomes of the columella and alar base in patients undergoing SRP.

**Material and Method**: Twenty-seven patients who underwent alar base reduction during primary open SRP were divided into two groups according to the intervened area as the Columella (CLM) group (n=27) and the Alar Base (AB) group (n=27). Irradiated polyglactin 911 was used in all patients. The modified Stony Brook Scar Evaluation Scale (SBSES) and a questionnaire form were used to measure scar outcomes and patient satisfaction. Columellar and alar base scar outcomes were compared.

**Results**: Patient satisfaction and scar outcomes were better in the CLM group. There was no significant difference, except for the first month total SBSES scores, between the CLM and AB groups. There was no significant difference in patient questionnaire scores between groups. In the early period, there were more signs of inflammation in the alar base than in the columella, without statistical significance.

**Conclusion**: Patient satisfaction and scar outcomes in the columellar area were favorable. Scar outcome on the alar base was statistically significantly worse than columella in the early period. There was no statistically significant difference between both areas in the long-term. Irradiated rapid vicryl can be used for closure of the alar base and columella, considering its advantages and disadvantages, in patients undergoing open septorhinoplasty with alar base reduction.

**Keywords**: Polyglactin 911, rhinoplasty, cicatrix, surveys and questionnaires, septorhinoplasty

## INTRODUCTION

Open septorhinoplasty (SRP) provides perfect surgical exposure with direct visualization and facilitates precise maneuvers. However, residual columellar incision scars or possible deformities due to scar formation are the main disadvantages of this technique. Scar formation is influenced by factors such as incision and closure method, as well as postoperative care (1-4). Previous studies have shown that absorbable sutures can be used safely in the columella without any long-term cosmetic concerns or an increased infection risk (5-7).

Alar base reduction is usually performed during SRP when the interalar distance surpasses the intercanthal distance or when the lateral portion of the ala extends significantly beyond the alar-facial groove (8). Although prolene suture is traditionally used, (1-3,8) some surgeons prefer continuing with the same absorbable suture in the alar base following columellar closure since it cuts costs and removes the need for suture removal. However, there are distinct anatomical differences between the alar base and the columellar area, such as the presence of sebaceous glands, the extent of adjacent muscles, and skin thickness. Because of these differences in anatomy, patients who have SRP with alar base reduction may end up with different scar outcomes.

To the best of the author's knowledge, there is no study in the literature comparing the scar outcomes of the alar base and columella. This study aimed to examine the scar outcomes of the columella and alar base in patients who underwent primary SRP using irradiated polyglactin 911 (rapid vicryl) in the early and long-term healing periods.

## MATERIAL AND METHOD

The study was carried out with the permission of Süleyman Demirel University Clinical Researches Ethics Committee (Date: 23/12/2021, Decision No: 23/357). All procedures were carried out in accordance with the ethical rules and the principles of the Declaration of Helsinki.

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### Study Population and Design

This single-center, retrospective study was carried out in Davraz Yaşam Hospital ear, nose, and throat clinic between June 2019 and December 2021. Each patient provided written informed consent for all diagnostic and treatment procedures. A portrait consent form was obtained from the patient whose photographs were used.

Patients who had alar base reduction during initial open SRP were retrospectively searched and invited to the clinic by phone for a follow-up visit. The study comprised 27 patients who responded to the invitation, consented to participate in the study, and had postoperative photographic documentation at the first and twelve months. Revision cases and cases where the nostril sill was cut out were not included. The patients were divided into 2 groups based on the intervention area: Columella (CLM) and Alar Base (AB). The senior author conducted all operations and closures, and irradiated polyglactin 911 (Vicryl Rapid TM 6/0; Ethicon Inc., Somerville, NJ, USA) was used. Follow-ups were performed on postoperative day 7, one, six, and twelve months afterward. Before surgery and at follow-ups after surgery, all patients were photographed in the same way, from six different angles, using the same professional camera (Olympus Imaging Corp., Shinjuku, Tokyo, Japan), lens (Sigma Corp., Kawasaki, Japan), and double para flash (TT560 Speedlite, Neewer, Shenzhen, China).

### Methods for Evaluation

At their scheduled follow-up visit, all of the patients were asked to use a satisfaction survey to rate their alar base and columellar scars after surgery for subjective evaluation (9) (**Table 1**).

**Table 1.** Satisfaction Survey

| 'How do you feel about your scar in the alar base/columellar region after rhinoplasty? | | 'Did you need to cover this scar? | |
|---|---|---|---|
| I am completely dissatisfied | 1 | Always | 1 |
| I am dissatisfied | 2 | Frequently | 2 |
| I am indifferent | 3 | Occasionally | 3 |
| I am satisfied | 4 | Extremely uncommon | 4 |
| I am extremely satisfied | 5 | Never | 5 |
| 0 worst/10 best | | | |

For objective evaluation another ENT specialist, who was blinded to the study, used the Modified Stony Brook Scar Evaluation Scale (SBSES) (10) (**Table 2**) to evaluate the first and twelfth-month photographs of the alar base and columella in all patients. Scars received a 0 or 1 score for the presence or absence of the following characteristics: elevation or depression, notching, hatching, and overall look. The color was assessed on a scale of 0 (worst) to 2 (best). Patient questionnaires and one- and twelve-month modified SBSES scores were examined.

**Table 2.** Modified Stony Brook Scar Evaluation Scale

| Scar category | Points |
|---|---|
| **Height** | |
| Depressed or elevated from surrounding skin | 0 |
| Flat | 1 |
| **Color** | |
| Darker than surrounding skin (Hyperpigmentation) | 0 |
| Slightly Darker than surrounding skin (Slight pigmentation) | 1 |
| Same color or lighter | 2 |
| **Notching** | |
| Present | 0 |
| Absent | 1 |
| **Hatching** | |
| Present | 0 |
| Absent | 1 |
| **Overall appearance** | |
| Poor | 0 |
| Good | 1 |
| Total scar score: sum of individual scores; range, 0 (worst) to 6 (best). | |

### Surgical Technique

After local anesthetic injection (1% lidocaine with 1:100,000 epinephrine) for hemostasis, an inverted 'V' incision and bilateral marginal incisions were made at the narrowest level of the columella with a No. 15 blade in all patients. Lateral columellar incisions were made close to the posterior 1/3 projection of the medial crus and joined with the marginal incisions of the lateral crus (**Figure 1**). Columellar incisions were closed with 12 full-thickness simple stitches (11). In all cases, a modified Weir incision was made in the alar base, with the lateral incision positioned at the level of the alar-facial groove, and wedge resection was performed. (**Figure 1**). Simple interrupted sutures were utilized to close the wound margins after bipolar cauterization. All patients were told to apply hydrogen peroxide and mupirocin ointment twice daily for seven days to avoid crusting. Sutures in the alar base and columella weren't trimmed soon, and no patients were advised to use external scar-revision prescriptions following surgery. There were also no patients with hypertrophic scars or keloids.

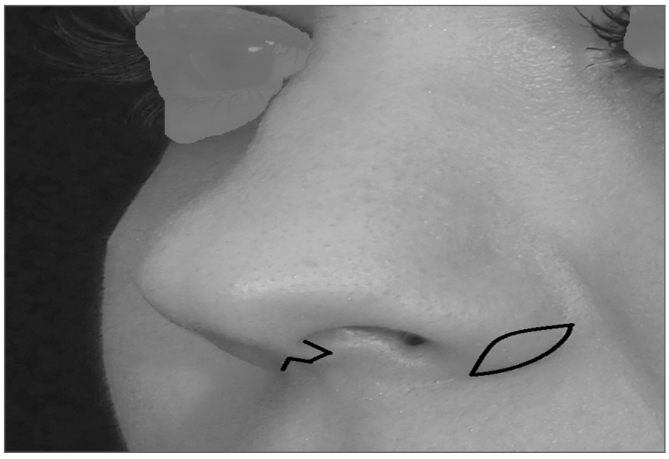

**Figure 1.** Inverted 'V' incision on columella and Modified Weir incision on the alar-facial groove.

### Statistical Analysis

The SPSS version 25 program was used for statistical analysis (IBM Corp., Armonk, NY, USA). Continuous data were represented by the mean standard deviation (SD), whereas categorical variables were represented by n and frequency. The Kolmogorov-Smirnov and Shapiro-Wilk tests were utilized to test the normality of continuous variables. The Independent Sample T-test was used in the comparison of the two groups for variables which is normally distributed. The Mann-Whitney U test was used in the comparison of the two groups for variables which is not normally distributed. A p-value <0.05 was accepted as statistically significant. The Chi-Square test or Fisher's exact test (when chi-square test assumptions do not hold due to low expected cell counts), where appropriate, was used to compare these proportions in different groups.

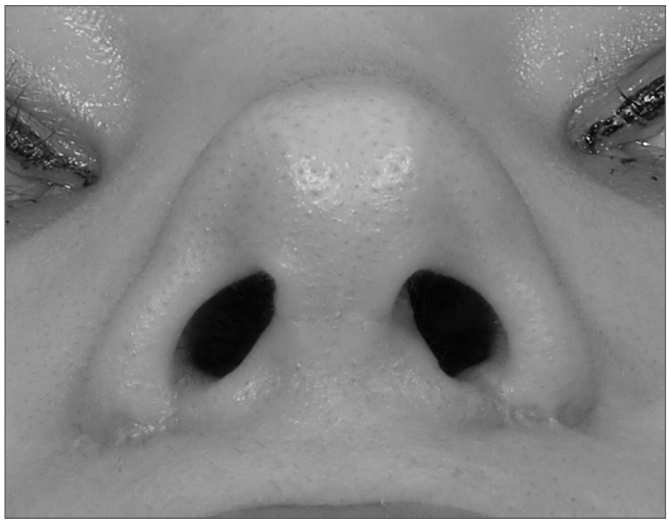

**Figure 2.** Noticeable notching in the alar base and acceptable scar in columella at 12. months follow-up.

## RESULTS

Three (11%) of 27 patients were male and 24 (89%) were female. The mean age was 25±7.1 (range, 18 to 54). Since the outcomes were not affected by age and gender variables in this study, these variables were not analyzed statistically. The mean time to the patient questionnaire was 16.07±4.79 months.

The mean patient questionnaire total score was 9.11±1.01 and 8.37±2.23 in the CLM group and AB group, respectively (**Table 3**). There was no statistically significant difference in the patient questionnaire scores between groups (p=0.639). The mean total SBSES scores regarding the intervened area were 5.40±0.50 and 4.62±1.15 at one month and 5.62±0.49 and 5.07±1.27 at twelve months in the CLM group and AB group, respectively. The power analysis of the studied parameters in this study was the lowest at 80% and the highest at 99% percent, given the all variables.

**Table 3.** Patient questionnaire according to the intervened area

| Scar Questionnaire | Alar Base | Columella | p |
|---|---|---|---|
| Satisfaction | 3.88±1.25 | 4.40±0.69 | 0.248 |
| Need to hide | 4.40±1.06 | 4.70±0.60 | 0.431 |
| Total score | 8.37±2.23 | 9.11±1.01 | 0.639 |
| Questionnaire time | 16.07±4.79 months | | |

There was a statistically significant difference in total SBSES scores between the columella and the alar base in the first month. However, there was no statistically significant difference between the groups at twelve months, Detailed SBSES scores for the groups are given in **Table 4**. Infection, dehiscence, or significant wideness of the scar were not seen in either intervened area.

**Table 4.** Modified Stony Brook Scar Evaluation Scale outcomes of columella and alar base

| SBSES | Columella n (%) Month 1 | Alar Base n (%) Month 1 | p | Columella n (%) Month 12 | Alar Base n (%) Month 12 | p |
|---|---|---|---|---|---|---|
| Height | | | | | | |
| Depressed / elevated | 0 (0) | 3 (11) | 0.236 | 2 (7) | 2 (7) | -- |
| Flat | 27 (100) | 24 (89) | 0.236 | 25 (93) | 25 (93) | 1.000 |
| Discoloration | | | | | | |
| Hyperpigmentation | 0 | 1 | 1,000 | 0 | 0 | -- |
| Slight pigmentation | 16 (59) | 22 (81) | 0.074 | 3 (11) | 5 (19) | 0.704 |
| Same color or lighter | 11 (41) | 5 (19) | 0.074 | 24 (89) | 22 (81) | 0.704 |
| Notching | | | | | | |
| Present | 0 (0) | 5 (19) | 0.51 | 5 (19) | 9 (33) | 0.214 |
| Hatching | | | | | | |
| Present | 0 (0) | 4 (15) | 0.111 | 0 (0) | 2 (7) | 0.491 |
| Overall appearance | | | | | | |
| Poor | 0 (0) | 2 (7) | 0.491 | 0 (0) | 7 (26) | 0.010 |
| SBSES Group | | | | | | |
| Moderate | 0 (0) | 4 (15) | 0.111 | 0 (0) | 7 (26) | 0.010 |
| Good | 27 (100) | 23 (85) | 0.111 | 27 (100) | 20 (74) | 0.010 |
| **SBSES Score** | **(mean±sd)** | | | **(mean±sd)** | | |
| Total | 5 (5-6) | 5 (2-6) | 0.005 | PG 6 (5-6) | PP 6 (3-6) | 0.333 |

SBSES: Stony Brook Scar Evaluation Scale, sd: Standart deviation

## DISCUSSION

In the current study, the total SBSES score of the alar base was low in the first month with a statistically significant difference. However, there was no statistically significant difference in long-term total SBSES and patient questionnaire scores between groups. The reason for the low total SBSES score in the alar base in the first month was thought to be that slight pigmentation was higher in the alar base. At 12 months, as the wound matured, the difference in slight pigmentation decreased, and the total SBSES score of the alar base increased. Nevertheless, the total SBSES score in the alar base was still low, predicting poor outcomes, but there was no statistically significant difference between the two groups.

In this study, scar outcomes of the alar base and columella were compared in patients undergoing SRP using irradiated rapid vicryl sutures. To the best of the authors' knowledge, this is the first study to compare the scar outcomes of the alar base and columella in the literature. The outcomes of this study support the findings of the recent study that compared the effects of rapid vicryl and polypropylene use on scar results in the alar base and reported poor outcomes in the alar base (10).

According to Kriedel et al. (8), denser sebum glands in the alar-facial groove may contribute to poor scarring of Weir incisions by predisposing to epithelial cysts and micro-abscess formation during the healing process. The depressor septi nasi muscle has been reported to cause a notch effect on the columellar scar by creating tension on the incision edges (13). There are numerous muscles that may cause similar tension in the alar base. The dilatator naris muscle and the alar portion of the nasalis muscle attach directly to the alar skin and the levator labii superioris partially to the vestibular skin of the nasal vestibule (13,14) According to Daniel et al. (14), the alar base is a dynamic structure integrated with the nasal superficial musculoaponeurotic system and even the entire facial musculature. In addition, Parell et al. (15) reported that there may be an increase in wound tension in scar tissue on a bone structure. The edges of the alar base excision may be more prone to traction than the columella due to the various surrounding muscles and bone structure beneath. Due to the structural differences mentioned above, patients undergoing alar base reduction may have worse scar outcomes compared to those in the columellar area. Nevertheless, despite lower scores, there was no statistically significant difference in the notching between the groups in this study, but the number of notching increased in both groups as the wound matured at the 12th month. In addition, there was a statistically significant difference in terms of overall appearance between groups in the long-term. When photographs of patients with notching in the columella and alar base were examined, the notching was less noticeable at the level of columellar corner stitches but more numerous and noticeable along the alar base incision line. Multiple notches along the incision line may have caused the poor 12th month overall appearance.

It is reported that the use of irradiated rapid vicryl resulted in low inflammation and local reactions with favorable long-term aesthetic results on facial skin wounds (15-18). It is also easy to tie and absorbable, which makes the patient feel less pain and saves time in the clinic (9,15). However, because of its structural features, it may tend to promote infection and cause inflammation. Furthermore, there is one study in the literature that shows that using irradiated rapid vicryl in the inframammary area caused discoloration and scar hypertrophy that lasted up to a year (19). The inflammatory symptoms in the current study were compared by grading color changes in the early and long-term periods between intervened areas. There was difference a in the discoloration at one month postoperatively without statistical significance. More signs of inflammation were detected in the alar base compared to the columella in the early healing period. This finding indicates that scar outcomes may be variable due to structural differences in the alar base and columellar area in the early healing period.

Following a conservative approach with fundamental surgical concepts such as right-angle precise skin cuts, eversion of the wound margins during the closure, and attentive postoperative care may result in favorable scar results. In order to avoid hatching, stitches should not be overly tight. Notching may be a result of carrying the modified Weir incision into the deep muscle layer, as reported by Kriedel et al. (8) Antibiotic ointment and thorough cleansing of clusters should be applied after surgery.

The main strength of this study is that it uses subjective and single-blinded objective methods over the short and long-term healing periods. This study is valuable as it contributes to the literature and increases awareness that a single type of suture material may not yield good outcomes in all regions where it is applied. The study's main limitations are its limited sample size and retrospective nature. Further large-scale, prospective, randomized studies are required to reach more accurate findings on this topic.

## CONCLUSION

This study demonstrates that patient satisfaction and scar outcomes in the columella were favorable. Further, irradiated rapid vicryl can be recommended in columellar closure owing to its potential advantages of having a good cosmetic outcome, causing less patient discomfort, and shortening the follow-up time required to remove the sutures.

## ETHICAL DECLARATIONS

**Ethics Committee Approval:** The study was carried out with the permission of Süleyman Demirel University Clinical Researches Ethics Committee (Date: 23/12/2021, Decision No: 23/357).

**Informed Consent:** All patients signed the free and informed consent form.

**Referee Evaluation Process:** Externally peer-reviewed.

**Conflict of Interest Statement:** The authors have no conflicts of interest to declare.

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**Author Contributions:** All of the authors declare that they have all participated in the design, execution, and analysis of the paper and that they have approved the final version.

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